REMARKS

Amendments to the Claims:

Dependent claims 5, 8, 28, 31, and 88 are merged into all independent claims 1, 21, 78, and 90. No new matter is entered.

Double Patenting Rejections:

Claim 1 of the claimed invention is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of co-pending Application 11/246,268 (hereinafter called the reference 268).

However, the amended independent claim 1 of the claimed invention is directed to:

"A storage virtualization computer system comprising:

a host entity for issuing IO requests;

an external storage virtualization controller coupled to said host entity for executing IO operations in response to said IO requests; and

at least one physical storage device (PSD), each coupled to the storage virtualization controller through a point-to-point serial-signal interconnect, for providing storage to the storage virtualization computer system through the storage virtualization controller;

wherein said storage virtualization controller comprises:

a central processing circuitry for performing <u>said</u> IO operations in response to said IO requests of said host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in [[a]] <u>one of</u> said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in [[a]] <u>one of</u> said at least one IO device interconnect controller for coupling to [[a]] <u>one of</u> said at least

one physical storage device through said point-to-point serial-signal interconnect, said device-side IO device interconnect port being a serial port for point-to-point serial-signal transmission;

wherein said computer system further comprises a detachable canister attached to said storage virtualization controller for containing one of said at least one PSD therein;

wherein said storage virtualization controller is configured to define at least one logical media unit consisting of sections of at least one said PSD; and

wherein said SVC issues a device-side IO request to said IO device interconnect controller, and said IO device interconnect controller re-formats said device-side IO request and accompanying IO data into at least one data packet for transmission to said PSD through said device-side IO device interconnect port."

In contrast, the reference 268 is directed to a computer system comprising: **a redundant external storage virtualization controller (SVC) pair** for performing IO operations in response to IO requests issued by the host entity comprising **a first and a second external SVC** coupled to the host entity; and a set of at least one physical storage device (PSD) for providing data storage space to the computer system, with at least one member of said set of at least one PSD comprising a PSD coupled to the said redundant SVC pair through a point-to-point serial signal interconnect for transmission with SAS protocol; wherein **when one SVC in the said redundant SVC pair is not on line or goes off line after being on line, the alternate SVC in the said redundant SVC pair will automatically take over the functionality originally performed by the said one SVC in the redundant SVC pair** (see claim 1). and the reference 268 further discloses **an access control switch** coupled between a PSD and the redundant SVC pair selectively allows patching through of the serial signal of the PSD to and from the first SVC when in a first patching state of the access control switch and to and from the second SVC when in a second patching state of the access control switch.

Moreover, the reference 268 claims at least one **SAS device-side IO device interconnect port** provided in a said at least one IO device interconnect controller

coupled to said at least one PSD through a point-to-point serial-signal interconnect.

Apparently, the reference 268 claims the following characteristics, while the present claimed invention does not.

a redundant external SVC pair;

wherein when one SVC in the said redundant SVC pair is not on line or goes off line after being on line, the alternate SVC in the said redundant SVC pair will automatically take over the functionality originally performed by the said one SVC in the redundant SVC pair;

a point-to-point serial signal interconnect for transmission with SAS protocol;

SAS device-side IO device interconnect port.

On the other hand, the present claimed invention claims the following characteristics, while the reference 268 does not.

through said point-to-point serial-signal interconnect, said device-side IO device interconnect port being a serial port for point-to-point serial-signal transmission;

said computer system further comprises a detachable canister for containing one of said at least one PSD therein;

said storage virtualization controller is configured to define at least one logical media unit consisting of sections of at least one said PSD;

said SVC issues a device-side IO request to said IO device interconnect controller, and said IO device interconnect controller re-formats said device-side IO request and accompanying IO data into at least one data packet for transmission to dais PSD through device-side IO device interconnect port.

Since these two patent applications are quite different, no double patenting is raised between the reference 268 and the claimed invention.

In addition, the reference 309 is directed to a storage virtualization computer system comprising: an external storage virtualization controller coupled to said host

entity for executing IO operations in response to said IO requests; and at least one physical storage device (PSD), each coupled to the storage virtualization controller through **a SAS interconnect**, for providing data storage space to the storage virtualization computer system through the storage virtualization controller,

wherein said external storage virtualization controller comprises:

a central processing circuitry(CPC) for performing IO operations in response to said IO requests of said host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller fro coupling to said host entity; and

at least one **SAS device-side IO device interconnect port** provided in a said at least one IO device interconnect controller for coupling to a said at least one physical storage device.

Apparently, the reference 309 claims the following characteristics, while the present claimed invention does not.

SAS device-side IO device interconnect port;

SAS interconnect.

On the other hand, the present claimed invention claims the following characteristics, while the reference 309 does not.

through said point-to-point serial-signal interconnect, said device-side IO device interconnect port being a serial port for point-to-point serial-signal transmission;

said computer system further comprises a detachable canister for containing one of said at least one PSD therein;

said storage virtualization controller is configured to define at least one logical media unit consisting of sections of at least one said PSD;

said SVC issues a device-side IO request to said IO device interconnect controller, and said IO device interconnect controller re-formats said device-side IO request and accompanying IO data into at least one data packet for

transmission to dais PSD through device-side IO device interconnect port.

Since these two patent applications are quite different, no double patenting is raised between the reference 309 and the claimed invention.

Accordingly, Applicants respectfully request that the rejections under the judicially created doctrine of obviousness-type double patenting be withdrawn.

Claims 1-8, 10-22, 24-53, and 78-95 are objected to because the letter 'a' should not be placed before the word 'said'. This problem should be corrected by removing "a".

All occurrences of "a said" have been amended to "one of said" in the above described amendments to the claims. No new matter is entered.

Claims 1, 21, 78, and 90 are rejected under 35 USC 102e as being anticipated by Meehan et al. (US pub. 2004/0177218).

Because the claim limitations in the dependent claims 5, 8, 31, and 88, which are not rejected under 35 U.S.C. 102 but simply rejected under 35 U.S.C. 103(a), have been merged into the above amended independent claims, the rejection to the amended independent claims 1, 21, 78, and 90 under 35 U.S.C. 102 should be withdrawn.

Claims 1-16, 20-37, 41-46, 50, 78-83, 86-88, 90-94, and 96 are rejected under 35 USC 103a as being unpatentable over Bicknell et al. (US pub. 2003/0193776) in view of Meehan et al. (US pub. 2004/0177218).

Meehan or Bicknell is much different from the present claimed invention as amended.

As a matter of fact, Meehan relates to a method, apparatus and system for implementing "a multi-level redundant array of independent disks (RAID) architecture" to increase data storage system performance and/or redundancy of data. In one embodiment, the RAID architecture includes, at the lowest or n-th layer, a plurality of nodes or storage devices implementing striped, mirrored,

and/or other RAID algorithm, and assigned a system identification or LUN (logical unit number). This is clearly shown and pointed out by the title and abstract.

In addition, please refer to Figs. 3 through 5 thereof, in which Fig. 3 illustrates a first embodiment, and Fig. 5 illustrates a second embodiment, of Meehan's invention, while Fig. 4 illustrates the flow of data in RAID architecture of Fig. 3. With Figs. 3 through 5 and paragraphs (0013) to (0026) thereof, the disclosure explains in every detail the "Multiple level raid architecture."

For example, please refer to Figs.3 and 4 and paragraphs (0013) to (0018) of Meehan, in which "Fig.3 illustrates a block diagram of a RAID architecture 200, according to one embodiment of the present disclosure. Referring to Fig.3, the RAID architecture 200 includes a primary RAID controller 205 at a first RAID level (or stage) and "m" secondary RAID controllers210 (nodes) at a secondary RAID level (or stage)....(0014) **In one exemplary embodiment, this RAID architecture can implement a RAID 4/5 at the primary RAID controller 205 and a RAID 0 at the secondary RAID controllers 210. In this embodiment, the primary RAID controller 205 writes data to and reads data from the secondary RAID controllers 210, calculating both parity and striping the data to maximize performance. The data received by each secondary RAID controllers 210 is then re-distributed to the lower level nodes. In the exemplary embodiment above, the data received by each secondary RAID controller 210 is written in a RAID 0 stripe to the lower level nodes, which in this embodiment are disk drives230....(0016)** Through this implementation, **this implementation of a multi-level RAID architecture allows for distribution of data to provide a balanced workload and an overall increase in system performance (0013).** Please also refer to Fig. 5 and paragraphs (0019) to (0026) of Meehan, in which another embodiment of a RAID architecture 300 according to the invention is also disclosed in detail.

FIG. 6 illustrates an embodiment of a RAID controller according to Meehan's invention. With FIG. 6 and paragraphs (0027) to (0029), a brief

explanation is given to the RAID controller 400. In paragraphs (0027) to (0029), the RAID controller 400 is explained without directing to any specific command interfaces (command protocols) except one sentence that "Given that the RAM 407, ROM 408, and FPGA 409 are manipulating the data to and from the storage devices, it would be possible to manage the data in any desired form required by/for the storage devices, RAID controller, and host bus adaptor, such as SCSI, ATA, FC, SATA, SAS or other command interfaces." Why ? This is because **"the command interfaces" are not the key point of Meehan, and thus, with the exception of aforesaid sentence, there is nothing more regarding "Command interfaces". Indeed, Meehan does not disclose anything about detailed descriptions of SATA command interfaces, command protocols, or SATA technologies! Therefore, Meehan does not disclose how to implement the present invention, in which the present invention has a storage controller having a IO controller which includes a SATA device-side IO device interconnect port for coupling to a physical storage device (such as hard disk).**

In short, Meehan's invention focuses on "Multiple level raid architecture" **and does not disclose anything in detail about the SATA technologies! Therefore, Meehan's invention does not disclose anything in detail about the technologies of point-to-point serial-signal transmission in the device-side signal transmission!**

On the other hand, as described above, again, as a matter of fact, Bicknell relates to disc storage subsystems, and to a disc storage subsystem having redundant controllers for improved reliability, in which the disc drive assembly includes a carrier supporting a disc drive having an Advanced Technology Architecture (ATA) data interface. The first and second controllers each include a data port corresponding to the disc drive. The intermediate electronic includes multiplexing electronics having first and second data communication paths. **The first data communication path provides electronic communication between the data port of the first controller and the data interface of the disc drive. The second data communication path**

provides electronic communication between the data port of the second controller and the data interface of the disc drive. The multiplexing electronics selectively opens and closes the first and second data communication paths in response to at least one control signal (please refer to paragraphs 0025 to 0027 and Figs. 6-8).

The architecture and work principle of this storage subsystem are explained in detail with Figs. 1-8 without pointing out which kind of ATA interface is used; rather, it is vaguely mentioned that the data interface can be serial ATA or parallel ATA. Why? The answer is that **"whether the ATA interface is a serial ATA interface or a parallel ATA interface is not the focus of Johnson."** Indeed, the dual data paths between the host and the disc drive is the focus of Johnson. **However, we can still recognize from Fig.3 that Johnson is embodied by the parallel ATA interface rather than a serial ATA interface.**

Please refer to Fig. 3, in which a parallel ATA disc drive 106 is disclosed. Please be noted that the disc drive 106 in Fig. 3 is a parallel ATA disc drive rather than a serial ATA disc drive. This can be recognized by the connector 146 that is a parallel ATA connector. Indeed, Bicknell does not disclose anything about detailed descriptions of SATA technologies! Therefore, Bicknell does not disclose how to implement the present invention, in which the present invention has a storage controller having an IO controller which includes a SATA device-side IO device interconnect port for coupling to a physical storage device (such as hard disk).

In short, Bicknell's **invention focuses on** "architecture of dual data paths between the host and a disc drive via two storage controllers" **and does not disclose anything in detail about the SATA technologies! Therefore,** Bicknell's **invention does not disclose anything in detail about the technologies of point-to-point serial-signal transmission in the device-side signal transmission!**

In contrast, please refer to paragraphs [0020] to [0023] of the present invention, in which **it is therefore a primary objective of the claimed invention to provide a**

storage virtualization computer system using point-to-point serial-signal transmissions as the primary device-side IO device interconnects. According to the claimed invention, a storage virtualization computer system is introduced. The storage virtualization computer system comprises a host entity for issuing an IO request, an external storage virtualization controller coupled to the host entity for executing IO operations in response to the IO request, and at least one physical storage device each coupled to the storage virtualization controller through a point-to-point serial-signal interconnect for providing storage to the storage virtualization computer system through the storage virtualization controller. In one embodiment, the point-to-point serial-signal interconnect is a Serial ATA IO device interconnect.

Again, paragraphs [0052] to [0055] of the present invention describes "The SATA IO device interconnect controller 300 is the device-side IO device interconnect controller connected between the CPC 240 and the PSD array 400. It serves as an interface and buffer between the SVC 200 and the PSD array 400 and receives IO requests and related data issued from CPC 240 and maps and/or transfers them to the PSD array 400. The SATA IO device interconnect controller 300 re-formats the data and control signals received from CPC 240 to comply with S-ATA protocol and transmits them to the PSD array 400." From aforesaid paragraphs, it can be known that **"the SATA IO device interconnect"** is indeed disclosed by the present invention. The SATA IO device interconnect is an underlying interconnect which is much different from "to manage the data in any desired form required by/for the storage device, RAID controller, and host bus adaptor, **such as SCSI, ATA, FC, SATA, SAS** or other command interfaces. For example, data may be transmitted between the RAID controllers and storage devices by means of an SCA or other type Interface Connector 410.", disclosed by Meehan, in which the SATA IO device interconnect of the present invention is not equal to SCSI, ATA, FC, SATA, SAS command interfaces of Meehan because of the following reasons:

(a)As we all know, **interconnect is the most underlying physical link media, while SCSI, ATA, FC, SATA, SAS command interfaces are commands**

which run on the interconnect for communication between devices, such as RAID controller or host bus adaptor(HBA).

Take fibre interconnect for example, where fibre interconnect is an interconnect on which SCSI or IP (Internet Protocol) commands can run for communication between devices, but Meehan fails to teach or suggest such interconnect. That is, Meehan only discloses SCSI, ATA, FC, SATA, SAS command interfaces (commands), but fails to disclose, teach or suggest such underlying interconnect, not to speak of SATA interconnect of the present invention.

(b)Meehan only discloses **SCSI, ATA, FC, SATA, SAS command interfaces for communication between devices**, but **fails to teach or suggest detailed descriptions of SATA interconnect, of SATA technology, and of how to practice through SATA protocol**. That is, Meehan does not teach or suggest at all how to practice through SATA.

In addition, the amended independent claims claim "said device-side IO device interconnect port being a serial port for point-to-point serial-signal transmission". In contrast, paragraph 0029 and Fig.6 of Meehan only discloses "For example, data may be transmitted between the RAID controller and storage devices by means of an SCA or other type Interface Connector 410.", but fails to teach or suggest **"said device-side IO device interconnect port being a serial port for point-to-point serial-signal transmission" and thus specification of Meehan fails to teach or suggest detailed descriptions of SATA, and of how to practice the embodiment through point-to-point serial-signal transmission.**

Please be noted that Meehan illustrated a FPGA 409 in Fig. 6 and disclosed in paragraph 0029; however, it is not clear what the FPGA 409 is. If the FPGA 409 is a chipset, then the IO device interconnect controller and the device-side IO device interconnect port provided in the IO device interconnect controller are not disclosed. On the other hand, if the FPGA 409 is the IO device interconnect controller, then the chipset and the device-side IO device interconnect port

provided in the IO device interconnect controller are not disclosed. In addition, if the FPGA 409 is the device-side IO device interconnect port, then the chipset and the IO device interconnect controller containing the device-side IO device interconnect port are not disclosed. Obviously, at least, either the IO device interconnect controller or the device-side IO device interconnect port provided in the IO device interconnect controller is not disclosed.

Also, please note that the IO device interconnect port according to the present invention has transport layer, link layer, and phy layer for data communication, while usually a connector 410 of Meehan is just a "connector" and does not have aforesaid data communication layers; therefore, the connector 410 of Meehan is not equal to host-side IO device interconnect port according to the present invention.

The amended independent claims **"a detachable canister attached to said storage virtualization controller for containing one of said at least one PSD therein."** In contrast, paragraph 0019 of Bicknell only discloses "Disc drive 106 can preferable be removed without disturbing the operation of subsystem100", but fails to teach or suggest **"a detachable canister attached to said storage virtualization controller for containing one of said at least one PSD therein."** Please be noted that "a detachable canister" is a canister which can receive therein a PSD and which can be detached from the storage virtualization controller.

The amended independent claims **"wherein said storage virtualization controller is configured to define at least one logical media unit (LMU) consisting of sections of at least one said PSD".** In contrast, paragraph 0007 of the present invention and Bicknell only disclose LMU, but fail to teach or suggest **said storage virtualization controller is configured to define at least one logical media unit (LMU).**

The amended independent claims **"wherein said SVC issues a device-side IO request to said IO device interconnect controller, and said IO device interconnect controller re-formats said device-side IO request and accompanying IO data into**

at least one data packet for transmission to said PSD through said device-side IO device interconnect port". In contrast, paragraph 0030 of Bicknell only disclose "All of the interfaces of the components of.....and/or power therbetween", but fails to teach or suggest "**said IO device interconnect controller re-formats said device-side IO request and accompanying IO data into at least one data packet for transmission to said PSD through said device-side IO device interconnect port". In other words, Bicknell fails to teach or suggest "said IO device interconnect controller re-formats said device-side IO request and accompanies IO data into at least one data packet for transmission."**

The amended independent claims claim "at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity". In contrast, interface connector 410 of Fig.6 of Meehan only discloses **"interface connector 410" (please refer to Fig.6 and paragraph 0029)**, but fails to teach or suggest **"at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller".**

According to MPEP 2141, Objective evidence relevant to the issue of obviousness must be evaluated by Office personnel. Graham v. John Deere Co. 383 U.S. 17-18, 148 USPQ at 467. In addition, *In re Sullivan* (Fed. Cir. 2007), Evidence rebutting a prima face case of obviousness can include: ...evidence of secondary considerations, such as commercial success and long-felt but unresolved needs, WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339, 1359 (Fed. Cir. 1999). When a patent applicant puts forth rebuttal evidence, the Board must consider that evidence. See In re Soni, 54 F.3d 746, 750 (Fed. Cir. 1995) (stating that "all evidence of nonobviousness must be considered when assessing patentability"); In re Sernaker, 702 F.2d 989, 996 (Fed. Cir. 1983) ("If, however, a patent applicant presents evidence relating to these secondary considerations, the board must always consider such evidence in connection with the determination of obviousness.").

Since the amended claim 1 has overcome the 102 rejection by merging the

limitations in the dependent claims, secondary considerations is respectfully requested.

Applicant wants to point out that the claimed invention is a technology of great commercial success for the following reasons.

First, Applicant's (Infortrend) first SATA product (model ESA16FG1A2) was first shipped to our customers at a very early time of 2003/6/27. At that time, there were very few other SATA products existing in the market, if any. Applicant later announced such SATA products in press releases of August 27, 2003 in Chinese and of Sep 9, 2003 and Sep 16, 2003 in English. Please see attachments 1-3.

Second, some of Applicant's SATA models, such as redundant controller SATA RAID subsystem (model EonStorT A16F-R), were brought onto the market earlier than all competitors, around September 2003. Please see attachment 4, a report on "2003, November week, news archive on STORAGE search .com".

Website links for the attachments are as follows:
Attachment1: http://www.infortrend.com.tw/News/20030827/PR_A16F-R.pdf
Attachment2: http://www.infortrend.com/News/20030909/data_access.pdf
Attachment3: http://www.infortrend.com/News/20030916/f-esa16fu.pdf
Attachment4: http://www.storagesearch.com/news2003-nov4.html

Third, the revenue of Applicant grew greatly from about 60 million US dollars in 2003 to 90 million US dollars in 2004 because of the SATA products, where sales amount of SATA products accounted for 45% of 2004 revenue of the Applicant. Please see Table 1 below.

Fourth, the sales percentage of SATA products and the sales amount grew ever greater from 2005 to 2007, which shows that SATA products have been really

commercially successful products. Please see Table 1 below.

	2003	2004	2005	2006	2007
Revenue (Million US$)	60	90	90	90	90 (estimated)
SATA product Sales (%)	-	45%	45%	60%	65% (current)
Sales amount (Million US$)	-	40.5	40.5	54	58.5

Table 1 – Relation between revenue and SATA product sales for Infortrend.

Since the amended independent claim 1, 21, 78 and 90 have been patentably distinct from Meehan or Bicknell and their combination, and the claimed invention is a technology of great commercial success, the claims are now in condition for allowance.

As to the examiner's rejections to all dependent Claims, similarly, since independent Claims 1, 21, 78 and 90 do have the patentability in view of Meehan or Bicknell and their combination, the applicant believes that all dependent Claims depending on independent Claims 1, 21, 78 and 90 respectively, would certainly be patentable.

Regarding point 29 in the OA

Claims 7 and 33 of the present invention claim "a PSD can be attached to said

storage virtualization controller when said storage virtualization controller is on-line". In contrast, paragraph [0030] of Bicknell only discloses "All of the interfaces of the components of.....and/or power therbetween", but fails to teach or suggest "a PSD can be attached to said storage virtualization controller when said storage virtualization controller is on-line". Please also be noted that "a PSD can be attached to said storage virtualization controller when said storage virtualization controller is on-line" is much different from "at least one PSD can be detached from said storage virtualization controller when said storage virtualization controller is on-line," which will be explained as follows. When a computer is working, if the CPU is removed from the mother board, the mother board will almost always be destroyed. However, for some IO devices attached to a computer through a port or slot when the computer is powered down, if it is removed from the computer after the computer is powered on, it could happen that the port or slot might not be used again until reset or IO devices could be damaged in case the computer system does not provide some kind of hot-swappable function or protection mechanism or the removal procedure is incorrect. In addition, even if a device can be removed when a computer system is powered on without damaging itself or the computer, it does not mean that a device can be attached to the computer system and can be further recognized by the computer and function normally with the computer system.

Regarding point 31 in the OA

Claims 10 and 24 of the present invention claim wherein one of said host-side IO device interconnect port and one of said device-side IO device interconnect port are provided in the same IO device interconnect controller. In contrast, paragraph 0029 and fig.6 of Meehan fail to teach or suggest wherein one of said host-side IO device interconnect port and one of said device-side IO device interconnect port are **provided in the same IO device interconnect controller**.

Regarding point 32 in the OA

Claims 12 and 27 of the present invention claim wherein said storage

virtualization controller comprises a plurality of host-side IO device interconnect ports each for coupling to a host-side IO device interconnect. In contrast, fig.6 of paragraph 0026 of Bicknell fail to teach or suggest wherein said storage virtualization controller comprises **a plurality of host-side IO device interconnect ports each for coupling to a host-side IO device interconnect.**

Regarding point 33 in the OA

Claims 13 and 29 of the present invention claim wherein said storage virtualization controller is **configured to present redundantly a logical media unit on at least two of said plurality of host-side device interconnect ports.**

Moreover, please refer to paragraph [0098] of the present invention, in which another feature that an SVC might typically implement is redundancy in the host-side interconnects in which multiple host-side interconnect ports are included on the SVC and **LMUs are presented to the host identically over two or more of these interconnects.** This feature is designed to allow the host the ability to maintain access to the LMU even if one of the interconnects and/or ports on the interconnect should break, become blocked or otherwise malfunction. That is, said storage virtualization controller is **configured to present redundantly a logical media unit on at least two of said plurality of host-side device interconnect ports twice.**

In contrast, paragraph 0019 of Bicknell only discloses "Disc drive 106 also includes a data interface 144.....due to disc drive failure", but fails to teach or suggest **"wherein said storage virtualization controller is configured to present redundantly a logical media unit on at least two of said plurality of host-side device interconnect ports."**

Regarding point 38 in the OA

Claims 34 and 96 of the present invention claim **wherein said storage virtualization controller further comprises at least one multiple-device device-side expansion port for accommodating an additional set of at least one PSD.**

Please refer to paragraph [0100] of the present invention, in which Storage virtualization subsystems typically also include functionality that allows devices in the subsystems, such as power supplies, fans, temperature monitors, etc, to be managed and monitored by the SVC(s). As mentioned before, this functionality is commonly referred to as enclosure management services (EMS). Often times, EMS is implemented using intelligent circuitry, that is circuitry that includes a CPU and runs a software program to achieve the desired functionality. Traditional Parallel SCSI and Fibre SV subsystems have typically relied on the standard SCSI protocols SAF-TE and SES, respectively, as the primary communication mechanism that the SVC uses to communicate with the SVS's EMS. These protocols, in turn, rely on a connection between the SVC(s) and the SVS consisting of an IO device interconnect that provides transport of SCSI command protocol, such as Parallel SCSI or Fibre interconnects. However, in the typical S-ATA SVS, there is no such connection between the SVC(s) and the "local" SVS **(note that the expansion ports do provide such a connection to "remote" JBOD subsystems, but not to the "local" SVS).** Such a connection could be implemented, but it would increase the cost of the SVS significantly. A more cost-effective solution would be to use a low-cost interconnect and communicate over this interconnect using proprietary protocols.

In contrast, the Midplane Card ports 209 of Fig. 6 of Bicknell only discloses the midplane card ports 209 are connected to data ports 204 of controller, but fails to teach or suggest "**wherein said storage virtualization controller further comprises at least one multiple-device device-side expansion port for accommodating an additional set of at least one PSD.**"

Regarding points 39, 40, 41, 42, 43, 44, 49, 50, 51, 52, and 53 in the OA

Claims 42, 43, 44, 45, 46, 47, 48, 50, 80, 81, 82, 83, 84, and 85 of the present invention claim **"an(said) enclosure management services mechanism(EMS)".** please refer to paragraph [0056] of the present invention, in which in this embodiment, **an enclosure management service (EMS)** circuitry 360 is attached to the CPC 240 for managing and monitoring at least one of the following devices belonging to the

storage virtualization subsystem 20: **power supplies, fans, temperature sensors, voltages, uninterruptible power supplies, batteries, LEDs, audible alarms, PSD canister locks, door locks.** However, in another arrangement of the SVS 20, the EMS circuitry 360 can be omitted, depending on the actual requirements of the various product functionality. Alternatively, the function of the EMS circuitry 360 can be incorporated into the CPC 240. Aspects of the EMS will be discussed later.

In contrast, paragraph 0037 of Bicknell and all of the cited references only discloses "The ultiplexing electronics selectively opens and closes the first and second data communication paths", but **fail to teach or suggest such EMS of the present invention. Since failing to teach or suggest such EMS, it is apparent that these claims can be patentably distinct from the cited references and thus are allowable.**

Conclusion:

Thus, all pending claims are submitted to be in condition for allowance with respect to the cited art for at least the reasons presented above. The Examiner is encouraged to telephone the undersigned if there are informalities that can be resolved in a phone conversation, or if the Examiner has any ideas or suggestions for further advancing the prosecution of this case.

Sincerely yours,

Winston Hsu Date: 12/06/2007

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Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 13 hours behind the Taiwan time, i.e. 9 AM in D.C. = 10 PM in Taiwan.)

Infortrend

普安科技發表 SATA 磁碟陣列系統

普安科技日前發表全新的 Fibre-to-SATA 磁碟陣列(RAID)系統–EonStor A16F，在有限的3U 機箱內，安裝 16 顆 SATA 硬碟，提供 4TB 以上的容量空間，滿足大資料量的應用需求及最低的單位成本($/MB)，是中小企業最佳的選擇。

EonStor A16F 磁碟陣列系統採用最新的 SATA 硬碟機，SATA 提高資料傳輸時的速率與完整性，提供標準的硬碟熱抽換介面，較長的資料傳輸距離。相對於 PATA，在資料儲存技術上有長足的提升。而且，SATA 硬碟機的價位僅與 PATA 相當。

對於目前已經使用 PATA 硬碟機的企業而言，EonStor A16F 提供了介面轉接板(Dongle board)，透過此轉接板可轉接 PATA 的硬碟以保障顧客既有的投資。對於 ATA 硬碟的管理部分(Intelligent Drive Management)，提供了自動偵測、掃描(Automatic disk media scan)與重新配置，可有效的管理及處理硬碟機的壞軌，以確保資料的正確性與完整性。

EonStor A16F 使用相互備援雙控制器(Active-Active) ，每一控制器提供 128MB – 1GB 快取記憶體，支援 RAID 層級 0, 1 (0+1), 3, 5, 10, 30, 50，於磁碟陣列中任何一顆硬碟故障時，提供自動或手動式資料重建，資料復原作業完全不需作業系統介入。系統本身亦提供多項容錯復原功能，如: 發生寫入錯誤時磁碟損壞的磁區可以自動由預留的磁區替代， 系統自動資料復原，熱備援磁碟，及線上資料重建等。另外，本系統提供熱插拔且相互備援的控制器、硬碟模組、散熱風扇及電源供應器，提供給企業用戶最高的安全性、速度、容量、資源共享及集中式管理的儲存環境，具有最佳功能/價格比的優勢，是企業用戶的第一選擇。

EonStor A16F 對於快取記憶體提供智慧型的保護功能，對於電源、電池、風扇、溫度異常時提供自動切換至 Write-through，以避免當外界因不可抗拒之因素而造成保存於快取記憶體中之資料流失，本產品亦採快取記憶體斷電保護之設計。於系統中以雙電池模組保護處於雙份備援模式下磁碟陣列控制器之快取記憶體，電池容量可提供七十二小時之續航能力，足夠維持完整之資料，於週末下班後發生之斷電情事。至週一上班，能提供系統管理者足夠時間處理斷電衍生的問題，並避免資料流失。

對於操作介面部分，提供自動設定程序，使用者可以選擇 LCD 控制面板或內建的 RS-232C 管理程式進行設定，或使用圖型介面管理程式，透過主機介面(In-band)或網路介面(Out-of-Band)即可提供完整的功能操作，其中包含硬碟狀態及環境溫度等監控。

普安科技 02-22260126

INFORTREND GREATLY ENHANCES DATA INTEGRITY AND ACCESS

New RAID Firmware Features Include Intelligent Drive Handling and 64TB Arrays

SANTA CLARA, Calif., September 9, 2003—RAID storage expert Infortrend® today announced it now provides a host of RAID storage management features that enhance data integrity, broaden RAID expansion and access, and increase performance and manageability of RAID storage arrays. Major features include access to up to 64 terabytes (TB) per array, intelligent drive management and enhanced responsiveness to critical conditions.

Incorporated in the company's latest releases of firmware and Java-based RAIDWatch™ management software, these features are available now with new serial ATA (SATA) and current generation Fibre Channel, SCSI and ATA RAID controllers and subsystems, including IFT-6330 12-bay ATA subsystems, SentinelRAID™ SCSI and EonRAID™ Fibre Channel controllers, and EonStor™ SATA RAID subsystems.

In addition to breaking the 2TB barrier with support for up to 64TB per array or logical drive (LD), Infortrend's new firmware allows access up to 1024 host logical unit numbers (LUNs) and 64 partitions per LD. Flexible configurations are possible down to the individual array level through variable striping size—from 4KB to 256KB—and a flexible write cache policy.

Enhanced Data Integrity

"Rising performance expectations of storage subsystems and the popularity of lower-cost SATA- and ATA-based RAID arrays present increased challenges to data integrity," said Joe Rorke, vice president of marketing for Rorke Data, an Infortrend storage integrator. "Intelligent drive handling with media scan enables storage managers to protect their data at a much lower cost, with much higher data integrity than was possible before."

Media Scan examines drives to detect the presence of damaged sectors or bad blocks. If any are found, that data is automatically stored onto undamaged sectors. If bad blocks are encountered on yet another drive during the rebuild process, those blocks or sectors will be earmarked to prevent further use. The rebuild will continue, thus enabling users to extract data from degraded or damaged disks. Its ability to work in both degraded mode and during rebuild operations to re-construct the array demonstrate the versatility of bad block management in minimizing the potential of data loss.

"In ATA-based disk arrays, there is an increased probability that bad blocks may simultaneously occur on two member drives in a single array, jeopardizing data integrity," stated Thomas Bayens, director of marketing for Infortrend. "Intelligent Drive Handling and automatic cache switching are particularly important for protection of inexpensive SATA and ATA hard drives, which are more susceptible to disk failure than enterprise-class, lower capacity Fibre and SCSI disk drives."

Other Firmware Suite Features

In addition to the prominent features described above, other highlights of this major firmware/software suite upgrade include:

- *User-selectable write verification*: available during rebuilds and LD initialization for enhanced reliability; can select for normal writes as well
- *Flexible cache switching :* When critical events such as overheating of key chips or loss of a fan or power supply occur, the cache policy can change from write-back to write-through to protect valuable data

-- more --

- *Auto-shutdown:* If the temperature does not return to normal within a user-specified time period, the subsystem may enter auto-shutdown mode to prevent information loss
- *Instant RAID:* Background LD initialization frees up administrator time and improves manageability
- *RAIDWatch agents: S*ecure socket layer (SSL)-enabled agents offer enhanced security
- *SNMP trap support:* Notifies network storage administrators of system events. A Management Information Base (MIB) file provides Get and Set Command support for Simple Network Management Protocol (SNMP) v2.0; trap notification for SNMP v1.1 is supported for plain text messages.
- *I/O channel diagnostics:* enables preventive maintenance and faster recovery by display of errors counts for items such as signal loss and link failures
- *Variable rebuild priority:* enables storage administrators to balance storage array loads and performance.

Providing network-wide RAID management, RAIDWatch software offers centralized issue notification and enables administration of all RAID arrays from a single screen for Windows, Linux, and Solaris operating systems. Out-of-band support for these and other operating systems such as Unix, Mac OS X, AIX, and HP-UX is available via web browser using an onboard Ethernet port. Detailed event notification can be provided via email, broadcast, and SNMP traps.

Product Availability

The above firmware and software features are included with each Infortrend controller or subsystem, which are available through Infortrend's worldwide network of OEMs, distributors and storage integrators.

About Infortrend

Focused on RAID storage technology since its founding in 1992, Infortrend designs, manufactures and markets cross-platform, high performance RAID storage solutions. The company specializes in firmware, driver, ASIC design and development of RAID controllers, subsystems and disk array appliances that are storage area network (SAN) ready, and support Fibre Channel, SCSI, ATA and SATA interfaces. Designed to be flexible, cost-effective and feature-rich, Infortrend products are available through a worldwide network of OEMs, distributors, and storage integrators for high availability storage applications.

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Infortrend®

INFORTREND SHIPS HIGH-CAPACITY SERIAL ATA RAID SUBSYSTEMS

Flexible SATA Storage Offers Affordability, Performance, Redundancy

SANTA CLARA, Calif., September 16, 2003—RAID storage expert Infortrend today announced it is now shipping dual host models of its EonStor™ Serial ATA (SATA) RAID subsystems in both Fibre Channel (A16F) and SCSI (A16U) host versions. The first of several, versatile high-capacity RAID storage enclosures, the new 16-bay EonStor SATA subsystem can support up to four terabytes of data using sixteen 250-gigabyte (GB) drives.

The EonStor Fibre-to-SATA RAID subsystem offers powerful performance, with over 250 megabytes per second (MBps) RAID 5 sustained reads and 160MBps sustained writes. The EonStor product line is built around Infortrend's RAID controller architecture, featuring its own custom ASIC, and supports up to one GB/second (GB/s) bandwidth, or two GB/s for redundant controller designs.

"Infortrend is one of very few companies with significant experience in developing both redundant RAID controllers and ATA-based RAID subsystems," stated Tony Prigmore, senior analyst at Enterprise Storage Group. "Consequently, Infortrend's SATA product line is positioned very well to serve the growing demand for less-expensive entry-level and midrange RAID solutions in the networked storage market."

"We have worked closely with Infortrend in the development of their new Serial ATA RAID product line," said Jim Gilbreath, director of marketing for Marvell's Storage Networking Business Unit. "We believe products like the EonStor Serial ATA RAID subsystems bring an attractive mix of price, performance, and capacity to the market."

Each controller supports up to 1GB cache memory, has an IBM PowerPC 750Cxe processor with both level one and 256KB of level two internal cache, one Ethernet LAN port, and two RS232 ports for out-of-band management and uninterruptible power supply (UPS) support. The EonStor SATA subsystems can also support the use of parallel ATA hard disk drives through the use of optional dongle boards.

"In addition to outstanding performance, the EonStor line offers the highest storage density in a 3U enclosure, while providing a modular, cable-free design," said Thomas Bayens, director of marketing for Infortrend. "Dependability is a key consideration for storage; every active component is fully redundant and hot-swappable, offering no single point of failure."

Infortrend RAID controllers and subsystems offer unparalleled flexibility with up to 1024 LUNs for host connection; 64TB capacity per logical drive (LD); multiple logical drive configurations—each with a different RAID level; online expansion for adding, copying and replacing drives; configurable optimization mode; background LD initialization and multi-host support. Broad RAID level support includes 0, 1(0+1), 3, 5, 10, 30, 50, JBOD, and NRAID.

EonStor 16-bay Enclosure Features:

Key features of the EonStor subsystem line include:

-- more --

- Highest storage density (16 bays) in 3U space
- Modular, cable-free design
- Two Ultra 160 SCSI ports or two 2Gbps Fibre Channel SFP ports per controller
- Sixteen drive trays for SATA or parallel ATA hard disk drives
- Fully redundant, hot-swappable active components
    - Dual cooling modules, with two fans in each
    - Dual power supplies with separate switches and power cords
    - Dual controller boxes for active-active operation (redundant models)
- Swappable Li-ION battery backup unit (BBU); supports up to 72 hours
- Environmental monitoring with SES and ISEMS interface protocols

Providing network-wide RAID management, Java-based RAIDWatch offers centralized issue notification and enables administration of all RAID arrays from a single screen for Windows, Linux, and Solaris operating systems. Out-of-band support for these and other operating systems such as Mac OS X, Unix and its variants is available via web browser using an onboard Ethernet port. Event notification can be provided via email, broadcast, and SNMP traps.

The EonStor RAID subsystem has been designed for maximum storage density while minimizing the dollar per GB ratio for end users, without compromising the overall usability, reliability and accessibility of the subsystem. The enclosure provides simplified access to all hot-swappable active components and drive trays.

Availability

The EonStor A16F-G Fibre-to-SATA and A16U-G SCSI-to-SATA single controller RAID subsystems began shipping in August through Infortrend's worldwide network of OEMs, distributors and storage integrators. The Fibre-to-SATA EonStor A16F-R with dual, redundant controllers will begin shipping in October.

About Infortrend

Focused on RAID storage technology since its founding in 1992, Infortrend designs, manufactures and markets cross-platform, high performance RAID storage solutions. The company specializes in firmware, driver, ASIC design and development of RAID controllers, subsystems and disk array appliances that are storage area network (SAN) ready, and support Fibre Channel, SCSI, ATA and SATA interfaces. Designed to be flexible, cost-effective and feature-rich, Infortrend products are available through a worldwide network of OEMs, distributors, and storage integrators for high availability storage applications.

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TORONTO, CANADA - November 26, 2003 - DataMirror today announced that it has entered into an agreement and plan of merger to acquire 100% control ofPointBase, Inc. The cash transaction (with a value of about $3.5 million) is conditional upon certain closing conditions, is expected to close in the next 30 days.

PointBase is a leading provider of nano footprint, java based relational database and synchronization solutions designed to lead the industry's move toward software that delivers on the promise of platform independence. PointBase's proven trio of offerings - PointBase Embedded, PointBase Micro and PointBase UniSync - provide effective Java-based data storage, enterprise mobility and data synchronization with corporate databases. PointBase technology is currently being used by leading software providers and companies including BEA, Checkmate International, Extensity, Leadscope, Macromedia, Raytheon and Sun Microsystems. With the implementation of PointBase technology, these companies have gained numerous business benefits including application mobility, reduced total cost of ownership, increased developer productivity,

Other news on this page

accelerated product release, increased customer satisfaction, and greater customer ROI. *...DataMirror profile*

FRAMINGHAM, Mass. - November 26, 2003 - The worldwide server systems market continues to gain ground, showing 2% revenue growth in the third quarter of 2003, according to IDC's Worldwide Quarterly Server Tracker. Worldwide server factory revenue topped out at $10.8 billion.

It was the 2nd consecutive quarter of positive growth for server revenues worldwide, following 9 quarters of decline during the economic downturn.

The **x86** server market dynamics drove much of the quarterly revenue growth year-over-year. In all, revenue derived from the sales of x86 servers (servers based on Intel and AMD microprocessors) expanded 8.3% and unit shipments grew 21.4%.

Linux server platforms posted a 49.8% growth in factory revenues, year-over-year (to reach $743 million), while unit shipments

Worldwide Server Systems Factory Revenue Q3 2003 source IDC		
Vendor	Revenue (millions)	Growth 2003/2002
IBM	$3,368	6.6%
HP	$2,997	3.5%
Sun	$1,165	-9.3%
Dell	$1,025	11.6%
Fujitsu	$684	-2.5%

Marvell Introduces 10GbE Switch

StorageTek adds 2 new Directors

SST Announces New CFO

earlier news (archive)

RAM

RAM manufacturers on STORAGEsearch.com

Megabyte found that RAM gave him fastest access to what he was seeking.

Nibble: Storage Industry gets Back to Revenue Growth

It looks like the 3rd quarter of 2003 wa turning point for the storage industry, v many companies reporting increased re compared to the same period in 2002.

There was a preview of this in my June the Fastest Growing storage companies which the top 5 companies reported ov year on year revenue growth. But in re years those were the exception rather th rule.

In fact the high fallout of storage comp made our acquired, dead & merged cor page one of the top 5 pages visited by STORAGEsearch readers throughout 2 as customers tried to find out what hap to once-upon-a-time suppliers.

A number of companies in different pr areas have recently announced revenue growth, and some even reported profits which suggests that the blood bath and shakeout we've seen in recenbt years m finally coming to an end.

grew 51.4%
year-over-year.

Unix server revenues were $4.1 billion in the quarter – a decline of just 3.8%, which is the lowest rate of decline in seven consecutive quarters. Driven by price competition as a sweetener, Unix server unit shipments showed an up-tick of 4.3% year-over-year. HP was the Unix server market leader in 3Q03, outpacing Sun, which had been the leader in 2Q03. Sun's Unix revenue declined by 10.1% year-over-year, but Sun's unit shipments grew by 17.4%, reflecting the company's focus on low-cost computing. *...IDC profile*

Editor:- November 25, 2003 - a new article is published today on STORAGEsearch, written by Jamie Matlin, President of Jobstor.com - it's called Looking into the Revolving Door of Storage Marketing. If the high turnover rate in storage marketers quoted in this article is to be believed then most storage marketers will be looking for a new job not long after slicing the turkey on Thursday. *...read the article, ...Jobstor.com profile*

SAN JOSE, Calif. - November 25, 2003 - Quantum Corp. today announced that it is reorganizing to create a stronger operational platform for profit and growth and leverage synergies across the company. Quantum's two business groups, the DLTtape Group and the Storage Solutions Group are being integrated into one organization with a consolidated operations function and three business units – Storage Devices, Media, and Storage Systems. The company will also combine the DLTG and SSG sales organizations into one OEM sales force and one Quantum-branded sales force.

Rick Belluzzo will continue in his role as chairman and CEO, and John Gannon, who has been president of DLTG, will assume the position of president and COO for the company. By integrating the two separate business groups, Quantum will eliminate duplicative functions and make it easier for customers, suppliers and other partners to do business with the company. As a result of the organizational changes announced today, Quantum will reduce its workforce by approximately 110 employee and 20 contractor positions, through the elimination of duplicative jobs and other streamlining. In addition, Larry Orecklin – who has been president of the Storage Solutions Group – has chosen to leave the company to pursue other opportunities. *...Quantum profile*

Editor's comments:- Quantum has been involved in 4 mergers and acquisitions since 2000, and from the outside the management of its brands and businesses has appeared like a temporary

- SimpleTech - revenue up 58%
- FalconStor - revenue up 43%
- Network Appliance - revenue u
- Infineon - revenue up 26%
- Western Digital - revenue up 2
- VERITAS - revenue up 23%
- QLogic - revenue up 22%
- Emulex - revenue up 20%
- EMC - revenue up 20%
- StorageTek - revenue up 4%

Also the hardening of memory prices, a upbeat comments from semiconductor like Cypress Semiconductor's President CEO T.J. Rodgers commenting on chip forcasts for 2004 - "...We shipped 160 units in the quarter, a record, beating th million units we shipped at the peak in 2000. If these trends continue, we belie there is a strong possibility that the mo recovery of 2003 will turn into a boom 2004-2005" - are good signs that the st industry may be returning to a better st health.

improvisation rather than a permanent consolidation. So this reorganisation should help reduce confusion in the marketplace.

November 25, 2003 - Infortrend Europe Ltd. today announced the EonStorT A16F-R SATA Redundant Controller subsystem. Infortrend's EonStor A16F-R is a 3U profile, 16-drive redundant controller subsystem and has made redundant controllers available on SATA RAID for the first time. This advancement in SATA RAID technology has been achieved through Infortrend's innovative firmware and hardware. The fully featured redundant architecture provides a true no-single-point-of-failure RAID configuration, with host-transparent active-active (or active-passive) redundant controller operations and host side IO loading balanced between the two controllers. The EonStor A16F-R product line is now shipping throughout Europe. *...Infortrend profile*

MOUNTAIN VIEW and SUNNYVALE, Calif. - November 24, 2003 - Atempo and Softek today announced the joint certification of their flagship software products, Time Navigator and Softek Storage Manager. Certification ensures seamless interoperability between the two products, making it possible for mid-tier and large enterprises to achieve a greater level of integration between storage management and backup administration. The combination of Time Navigator and Softek Storage Manager provides significant benefits across many of today's most popular business operating platforms, including Sun Solaris, Red Hat Linux, Windows 2000/XP and more. *...Atempo profile, ...Fujitsu Softek profile*

ALISO VIEJO, Calif. - November 24, 2003 - QLogic Corp. today announced it has been chosen to be the supplier of Fibre Channel HBAs for a series of simplified and cost effective SAN solutions built upon the HP StorageWorks Modular Smart Array 1000. The HP StorageWorks MSA1000 SAN Starter Kit offers everything needed for simple and rapid deployment of entry-level SANs targeted for the small and medium business. Customers can save substantially when they purchase the HP MSA1000 SAN Starter and High Availability Kits, as opposed to buying the same components separately. *...QLogic profile*

WALTHAM, MA - November 24, 2003 - AmeriVault Corp. today announced that it has upgraded its storage infrastructure in its Waltham, Massachusetts, Mass Storage Vault with the deployment of EMC CLARiiON CX storage solutions. This upgrade has improved the speed of AmeriVault's online backup and recovery offering by more than 40%, providing customers with faster server

Fibre channel cables
FireWire storage
Flash Memory
GBICs & SFPs
Hard drives
Hard disk duplicators
Industry trade associations
InfiniBand
iSCSI
JBODs
Jukeboxes
Memory
Military STORAGE
NAS
NAS routers
Rackmount storage
RAID controllers
RAID systems
Removable disk drives
SAN
SCSI adapter cards
SCSI cables
SCSI converters
SCSI terminators
Security
Serial ATA
Serial Attached SCSI
Services (SSP's)
Software - all

backups and more efficient data restores. AmeriVault's new CLARiiON CX-based infrastructure replaces the company's previous storage solution provider. The Mass Storage Vault is now exclusively composed of EMC networked storage.

AmeriVault's storage deployment consists of over 32 terabytes of CLARiiON CX600 and CX400 networked storage systems and software. AmeriVault's CLARiiON systems utilize both Fibre Channel and ATA drive technology - providing flexibility for the company to match customer service level requirements with the storage environment. The company is also using EMC SnapView software in conjunction with AmeriVault's backup offering for non-disruptive recovery operations, and EMC MirrorView to ensure business continuity in the event of a disaster. *...AmeriVault profile*

PALO ALTO, Calif - November 24, 2003 - HP today announced a new storage product family and packaged server-storage offerings designed to meet the needs of SMBs, as well as enterprise customers, at up to 50% below the prices of IBM and Dell/EMC. With estimated U.S. list prices starting at under $10,000 the HP StorageWorks MSA and HP ProLiant server packaged solutions tackle one of the biggest barriers preventing emerging businesses from adopting external shared storage - cost. *...HP profile*

SIMI VALLEY, Calif. - November 24, 2003 - NovaStor Corporation has appointed industry veteran David J. Katz II to the newly created position of vice president of customer relations. Katz brings 20 years of experience and a proven record of success in the areas of technical support, training and education, information services and professional services. As a Novell Certified NetWare Engineer, he has over 16 years of hands-on experience working with and providing technical support for Novell LAN. In addition, NovaStor customers will benefit from his comprehensive understanding and knowledge of the latest technology in a wide range of computer applications for business and industry.

"David will be the key liaison between NovaStor and our installed base of 5 million users," said Peter Means, company president, to whom he will report. "As we grow, it's imperative we stay close to our customers. David will be responsible for listening to them and making sure NovaStor develops products that meet their needs." *...NovaStor profile*

Sunnyvale, California - November 24, 2003 - Marvell today announced the release of its Prestera-98EX135, 10 Gigabit Ethernet packet processor with advanced routing and security capabilities.

Solid state disks

Tape drives & systems

Tape libraries

Test equipment

USB storage

Venture funds in storage

Web based storage

The Prestera-98EX135 device offers the industry's best routing capacity, advanced link aggregation features, extensive traffic classification and Policy Control Lists for traffic filtering. The routing capabilities have been extended to 256,000 subnets for better scalability, allowing customers to deploy Prestera solutions across the network, from the wiring closet through the backbone. *...Marvell profile*

LOUISVILLE, Colo. - November 24, 2003 - StorageTek today announced that Judy C. Odom and Mercedes Johnson have been elected to the StorageTek board of directors. Judy Odom's professional experience includes nearly 20 years at Software Spectrum Inc., a global provider of personal computer business software to large organizations. During her tenure at Software Spectrum, Judy Odom served as chairman and CEO. Before her term as CEO, she served as vice president and treasurer at Software Spectrum. Prior to co-founding Software Spectrum, Judy Odom was a partner with Grant Thornton. She joins the StorageTek board immediately. Judy Odom currently sits on the board of directors for Leggett & Platt Inc. and Harte-Hanks Inc. She hails from Dallas and has a bachelor's degree in accounting from Texas Tech University.

Mercedes Johnson is senior vice president and CFO of Lam Research Corp., a company that designs, manufactures, markets and services semiconductor-processing equipment. Prior to joining Lam, Mercedes Johnson spent 10 years at Applied Materials where she was vice president and worldwide operations controller. Mercedes Johnson has also held senior finance positions with NCR and Hewlett-Packard. She will join the StorageTek board in January. Mercedes Johnson resides in Fremont, Calif., and holds a master's degree in accounting from the University of Buenos Aires.

"We are delighted that Judy and Mercedes are joining the StorageTek board of directors," said Patrick J. Martin, StorageTek chairman, president and CEO. "A diverse board will bring valuable perspectives to our discussions. These new members offer us tremendous experience in finance and a keen sense for business that will prove a real asset to the future success of this company." *...StorageTek profile*

SUNNYVALE, Calif. - November 24, 2003 - Silicon Storage Technology, Inc. today announced that it has appointed Jack K. Lai as chief financial officer, replacing Jeffrey L. Garon, who is leaving the company to pursue other opportunities. Garon will provide transitional support to the company for a period of three months. Before joining SST, Lai was vice president and chief

financial officer of Aplus Flash Technology, a privately-held company. Lai holds MBAs from San Jose State University in San Jose, CA and Culture University in Taipei, Taiwan. He also holds a BA in business administration from Tamkang University in Taipei, Taiwan. *....Silicon Storage Technology profile*

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